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Report to Congress **March 2003**

Interdepartmental Rangeland Inventory, Monitoring and Assessment Steering Group

Ten-Year Plan to Complete Rangeland Soil Surveys and Ecological Classification

Periodic National Cooperative Rangeland Survey

REPORT TO CONGRESS

The present report responds to direction from Congress in the Department of the Interior and Related Agencies Appropriations Act of 2002. Congress specifically directed *"the Secretary of Agriculture and the Secretary of the Interior to jointly charter an interagency group to address rangeland assessment and monitoring issues at both local and national scales."* In addition, Congress expects *"the Secretaries to prepare, within 9 months of enactment, a coordinated 10-year plan and budget identifying the cost of completing standardized soil surveys and ecological classification on all rangeland for use at local management levels. The Committee also expects the Secretaries to devise a plan to determine standardized monitoring and assessment methodologies and project costs that would be needed to carry out a periodic National Cooperative Rangeland Survey."*

EXECUTIVE SUMMARY

Through the *Department of the Interior and Related Agencies Appropriations Act of 2002*, the Secretaries of Agriculture and the Interior were directed to accomplish three specific actions. The first, to jointly charter an interagency group to address rangeland assessment and monitoring issues at both the local and national scales. The second, to address a 10-year strategy and budget for completing soil survey and ecological classification on all rangelands in the United States for use at the local level. And the third, to address the development and implementation of a periodic National Cooperative Rangeland Survey.

Interdepartmental Rangeland Inventory, Monitoring, and Assessment Steering Group

As directed, the Secretaries of Agriculture and the Interior have chartered the Interdepartmental Rangeland Inventory, Monitoring, and Assessment Steering Group, which has responsibility for addressing rangeland assessment and monitoring issues at the local and national scales. Membership of the Group consists of senior agency positions responsible for providing leadership guidance and direction to the management of rangeland resources. A "working group" consisting of senior agency resource professionals will provide technical expertise and implement the direction provided by the Interdepartmental Rangeland Inventory, Monitoring, and Assessment Steering Group.

Soil Survey and Ecological Classification

Soil is one of the most fundamentally important natural resources to the health, diversity, and productivity of the land. For the purposes of this report, there are an estimated 842 million acres of rangeland in the United States. Of this acreage, almost 391 million acres (46%) require a soil survey and ecological classification. Approximately 666 million acres require correlation of existing ecological classification information into ecological site descriptions. Completing soil survey and ecological classification on the Nation's rangeland to support local land use planning and resource management would require an annual budget of $137 million over a 10-year period.

The completion of such a task within 10 years —an average of 84 million acres per year—is improbable in view of existing agency capabilities. Regardless of the time required, management of America's rangelands requires current soil and ecological classification information. It is of the utmost importance to continue and reinforce the Federal agencies' efforts.

Periodic National Cooperative Rangeland Survey

The need for a national assessment tool for the Nation's rangelands has been at the forefront of discussion for many years. In fact, several legal mandates address the collection of data and the assessment and reporting of the condition of the Nation's rangelands by the various Federal agencies. Two survey methods presently in use provide statistically valid national survey designs that could be used or modified to conduct a periodic National Cooperative Rangeland Survey.

By using a small, interdepartmental team of experienced resource professionals knowledgeable in the collection of rangeland data, a six-step, facilitated process could be used to establish a minimum data set for collection and develop a consistent method for assessing and reporting the status of America's rangelands.

It is projected that a national survey of approximately 8,000 sample points, which represents one sample plot per 100,000 acres, would be required to compile an inventory and assess the condition of the Nation's rangelands. Experience has shown that an average cost of $1,000 per sample point, or an estimated $8 million, would be required each time to implement a periodic National Cooperative Rangeland Survey.

INTRODUCTION

The *Department of the Interior and Related Agencies Appropriations Act of 2002*, passed on November 5, 2001, requires the Secretaries of Agriculture and the Interior to jointly charter an interagency group to address rangeland assessment and monitoring issues at both local and national scales. Specifically, the Act charged the Secretaries to prepare a coordinated, 10-year plan and budget identifying the cost of completing standardized soil surveys and ecological classification on all rangelands (both private and federally managed) for use at the local management levels. In addition, the Secretaries are expected to devise a plan to determine standardized monitoring and assessment methodologies and project costs that would be needed to carry out a periodic National Cooperative Rangeland Survey.

For the purpose of this report, rangeland is defined as "lands on which the indigenous vegetation (climax or natural potential) is predominantly grasses, grass-like plants, forbs, or shrubs and is managed as a natural ecosystem. If plants are introduced, they are managed similarly. Rangelands include natural grasslands, savannahs, shrublands, many deserts, tundras, alpine communities, marshes, and meadows" (Society for Range Management 1998). Rangelands also include lands revegetated naturally or artificially to provide a plant cover that is managed like native vegetation (United States Department of the Interior [USDI] and United States Department of Agriculture [USDA] 1996). A summary of rangeland acreage by land ownership is provided in Attachment 1.

INTERDEPARTMENTAL RANGELAND INVENTORY, MONITORING AND ASSESSMENT STEERING GROUP

Department of the Interior and Related Agencies Appropriations Act of 2002
(Partial language)

Congress specifically directed *"the Secretary of Agriculture and the Secretary of the Interior to jointly charter an interagency group to address rangeland assessment and monitoring issues at both local and national scales...."*

As directed, the Secretaries of Agriculture and the Interior have chartered the Interdepartmental Rangeland Inventory, Monitoring and Assessment Steering Group, which is responsible for addressing rangeland assessment and monitoring issues at the local and national scales. Membership of the Steering Group consists of senior agency positions responsible for providing leadership guidance and direction to the management of rangeland resources.

The responsibilities of the Steering Group will be to provide oversight and direction to rangeland monitoring and assessment issues at both the local and national scales. Such issues include establishing consistency, where applicable, between the agencies or Bureaus in methods used to collect and interpret monitoring and assessment information, ensuring compatibility of data across jurisdictional boundaries, and developing and implementing the periodic National Cooperative Rangeland Survey (if funded). A "working group" consisting of senior agency resource professionals will provide the technical expertise and implement the direction provided by the Interdepartmental Rangeland Inventory, Monitoring, and Assessment Steering Group.

TEN-YEAR PLAN AND BUDGET FOR COMPLETION OF SOIL SURVEYS AND ECOLOGICAL CLASSIFICATION

Department of the Interior and Related Agencies Appropriations Act of 2002
(Partial language)

Congress expects *"the Secretaries to prepare, within 9 months of enactment, a coordinated 10-year plan and budget identifying the cost of completing standardized soil surveys and ecological classification on all rangeland for use at local management levels."*

"Land, then, is not merely soil; it is a foundation of energy flowing through a circuit of soils, plants, and animals." – *Aldo Leopold, A Sand County Almanac, 1949*

Soil is one of the most fundamentally important natural resources to the health, diversity, and productivity of the land. Soil survey is the process of gathering and presenting information about soil properties and location on the landscape, and estimating the behavior of soils for various uses. In addition, information about landforms and landscape patterns, surface geology, climate, present and potential plant community composition and production, water-related characteristics, and engineering properties are included. Soil survey and ecological classification information is typically collected simultaneously in the field by an interdisciplinary team of soil scientists and rangeland management specialists.

Soil Survey Mapping Needs

The extent and usefulness of existing soil survey mapping information was determined by using mapping progress data and soil survey correlation dates from the Natural Resource Conservation Service (NRCS) Soil Survey Schedule,[1] as well as local knowledge of soil survey mapping quality. Criteria used to evaluate existing mapping information were as follows:

1. Existing soil survey mapping information meets and has been correlated to National Cooperative Soil Survey Standards
2. Soil mapping has been completed since 1975[2]

[1] The Soil Survey Schedule, a program management tool within the National Soil Information System, includes all soil survey areas of the Nation and is used for planning, managing, and tracking the status, milestone events, and progress of the National Cooperative Soil Survey. NRCS State soil scientists have overall management responsibility for the Soil Survey Schedule. In addition, NRCS has a national data steward with oversight responsibility.

[2] Date when the modern classification system of "Soil Taxonomy" was adopted

3. Mapping is sufficiently detailed[3] to meet present and future rangeland interpretation needs and criteria standards at local management levels

A summary of acreage requiring soil survey mapping is provided in Attachment 1.

Rangeland Ecological Classification Needs

Rangelands are divided into ecological sites for the purposes of inventory, evaluation, and management. An ecological site, as defined for rangelands, is a distinctive kind of land with specific physical characteristics that differs from other kinds of land in its ability to produce a distinctive kind and amount of vegetation (1997 NRCS National Range and Pasture Handbook). Ecological site descriptions, prepared for each individual ecological site, address all resources on a specific ecological site that are important for identifying, evaluating, planning, developing, managing, and monitoring rangeland resources.

The development of ecological site descriptions, as outlined in the September 1997 NRCS National Range and Pasture Handbook, requires the correlation of existing ecological information such as vegetative species, composition, production, soils, topography, and climate, as well as the collection of new information for those areas that have not been surveyed previously. Rangeland acreage requiring ecological site correlation or the collection of new information is given in Attachment 1.

Implementation Strategy

The NRCS is responsible for the soil survey mapping of all non-Federal soils in the United States. The Federal land management agencies are responsible for ensuring that soils and ecological communities are mapped on lands under their jurisdiction. The Soil Survey Division of the NRCS has leadership responsibility for the National Cooperative Soil Survey, which is a nationwide partnership of Federal, regional, State, and local agencies and land grant universities working cooperatively to inventory, document, classify, interpret, distribute, and maintain information about the soils of the United States and its trust territories and commonwealths.

> "... I cannot conceive of the time when knowledge of soils will be complete. Our expectation is that our successors will build on what has been done, as we are building on the work of our predecessors." --- *R. S. Smith, Director of the Illinois Soil Survey, 1928*

The Federal land management agencies use a combination of strategies, including interagency agreements, agency soil and rangeland professionals, and contracts with private vendors, to accomplish their responsibilities relating to soil surveys and ecological classification. The immensity of completing and maintaining initial and updated soil surveys and ecological classification on more than 842 million acres of rangeland is overwhelming. Completion of such a task within a 10-year period—an average of 84 million acres per year—is improbable in view

[3] Order 3 or more detailed. Portions of Alaska with low management intensity would require less detailed soil surveys.

of existing agency capabilities. Regardless of the time required, the management of America's rangelands requires current soil and ecological classification information, as well as maintenance of this information on a continuing basis. It is of the utmost importance to continue and reinforce the Federal agencies' efforts.

The NRCS is prohibited from mapping Federal lands without reimbursement from the Federal land management agency. Therefore, funding for soil surveys and ecological classification should be appropriated to each Federal land management agency to allow for maximum flexibility in completing soil surveys and ecological classification on the highest priority areas under its jurisdiction.

Cost Estimates

The Table portrays the projected cost estimates for completing soil surveys and ecological classification on rangelands. The cost estimates are based on an average of $3.00 per acre for soil surveys and collection of ecological classification data and $0.30 per acre for conversion of existing range site descriptions to the ecological site description format.

Specific soil survey mapping and ecological site description costs will vary depending on the level of detail (order) of the soil survey, site accessibility, soil pattern complexity,[4] and the influence of vegetation cover on visibility of the soil surface. The projected costs include actual and support costs for field mapping and documentation, data correlation, text and database preparation, digitizing, final report publication, and agency expenses for the prioritization, development, coordination, technical assistance, and administration of interagency agreements and private contracts.

Table. Cost for Rangeland Soil Survey and Ecological Classification Correlation

Land Ownership	Cost of Soil Survey and Collection of New Ecological Information	Cost of Ecological Site Correlation	Total Costs
Lands Administered by Federal Agencies	$658,794,000	$103,549,200	$762,343,200
Non-Federal Lands (private)	$514,014,000	$96,121,500	610,135,500
TOTAL	**1,172,808,000**	**$199,670,700**	**$1,372,478,700**

[4] Areas with complex patterns of soil types will require longer to survey than areas with relatively simple patterns of soil types. Areas with complex soil patterns will cost more to complete per acre than those with more simple soil patterns. Similarly, areas with extensive vegetative ground cover will require more extensive work to determine the type of soils than areas with a large amount of bare ground (less vegetative cover).

PERIODIC NATIONAL COOPERATIVE RANGELAND SURVEY

Department of the Interior and Related Agencies Appropriations Act of 2002
(Partial language)

"...The Committee also expects the Secretaries to devise a plan to determine standardized monitoring and assessment methodologies and project costs that would be needed to carry out a periodic National Cooperative Rangeland Survey."

Legal mandates address the collection of data and the assessment and reporting of the condition of the Nation's rangelands. The Bureau of Land Management (BLM) is required by section 201(a) of the Federal Land Policy and Management Act of 1976 to "prepare and maintain on a continuing basis an inventory of all public lands and their resources and other values...." Section 4(a) of the Public Rangelands Improvement Act of 1978 requires the BLM and U.S. Forest Service (USFS) to "update, develop (where necessary) and maintain on a continuing basis thereafter, an inventory of range conditions and record of trends of range conditions on the public rangelands...." In addition, the USFS is required by the Resources Planning Act of 1974 to compile an inventory of present and potential renewable resources of forests and rangelands of the United States. Likewise, the NRCS is required to appraise, on a continuing basis, the soil, water, and related resources of the Nation, within the scope of the programs under the Secretary of Agriculture, as described in the Soil and Water Resources Conservation Act of 1977.

The need for a national assessment tool for the Nation's rangelands has been at the forefront of discussion for many years. Recommendations for reporting rangeland condition at the national scale have been independently presented by the National Research Council (NRC 1994), the Society for Range Management (Task Group on Unity in Concepts and Terminology 1995), and western university academia (West et al. 1994). In 1995, the Society for Range Management recommended that all USDA and USDI agencies having requirements to report on the condition of the Nation's rangelands establish a consistent methodology using the latest scientific techniques to provide the public and Congress with an accurate assessment of the condition of rangelands. To meet the needs of Congress, Federal land management agencies, nongovernmental organizations, academia, and others, additional rangeland attributes or indicators may also be addressed by a periodic National Rangeland Survey.

Are Existing National- Platforms Presently Available From Which a Periodic National Cooperative Rangeland Survey Could Be Launched?

There are two national survey methods presently available that could be used or modified to conduct a periodic National Cooperative Rangeland Survey.

The National Resources Inventory (NRI) assessment, developed by the NRCS, provides a platform for national-level assessment of America's rangelands. Non-federal rangeland conditions were inventoried utilizing the NRI in 1982, 1987 and 1992. Only changes in land use status were assessed in 1997. New rangeland data elements, developed by an interagency team, are scheduled to be collected in 2003 as a component of the continuous NRI.

The Forest Inventory and Analysis (FIA), continuously administered by the USFS since 1930, is the Nation's forest survey, focusing on reporting the status and trend of forests. Although not presently used for rangelands, the FIA grid covers rangeland areas on both Federal and non-Federal lands and could be modified to assess the status of rangeland conditions and trend over time.

Recommended Approach for Developing a National Cooperative Rangeland Survey

The NRI and FIA provide statistically valid national survey designs for selecting geographically placed sample points. Each platform has a database for information management and storage of data. The geographically located sample points would allow repeated sampling over time of the many and various attributes of rangeland health.

Utilizing an interdisciplinary, interdepartmental team of experienced resource professionals knowledgeable in the collection of rangeland data, a six-step, facilitated process should be followed to develop a consistent method for assessing and reporting the status of America's rangelands. All recommendations from the interdepartmental team would be presented to the **Interdepartmental Rangeland Inventory, Monitoring, and Assessment Steering Group**[5] for approval.

Step 1: Identify the major management goals, decisions, legal mandates, conclusions, and other issues that need to be addressed by a periodic National Cooperative Rangeland Survey.

As described earlier, there are several legal mandates requiring inventory, assessment, and reporting of the condition of America's rangelands. To ensure all legal mandate requirements and nongovernmental organization and agency informational needs are met, all major management goals, decisions, legal mandates, and other issues that need to be addressed by a periodic National Cooperative Rangeland Survey should be identified.

Step 2: Identify and Recommend Appropriate Monitoring Attributes and Indicators to the Interdepartmental Rangeland Inventory, Monitoring, and Assessment Steering Group.

[5] Interagency group composed principally of senior agency leadership positions, directed by the *Department of the Interior and Related Agencies Appropriations Act of 2002,* to address rangeland assessment and monitoring issues at both the local and national scales.

The information required to respond to the needs identified in Step 1 varies depending on the specific need. There are several ongoing efforts (Sustainable Rangelands Roundtable, Heinz Report, and others) to identify national rangeland monitoring attributes and indicators. The Sustainable Rangelands Roundtable, composed of Federal, Tribal, and State agencies; professional societies; agricultural and environmental organizations; and universities, intends to finalize, by 2003, a candidate list of scientifically sound rangeland indicators of sustainability that can be measured and reported at the national level. The Sustainable Rangelands Roundtable candidate list of indicators and those from other similar efforts should be used as a source for potential indicators to be collected by the periodic Cooperative National Rangeland Survey.

Step 3: Develop, Field Test, and Recommend a Single Process for a Periodic National Cooperative Rangeland Survey

Utilizing the indicators approved in Step 2 and the two existing national-level platforms—NRI and FIA—the interdepartmental team should develop and field-test a single, periodic National Cooperative Rangeland Survey protocol. After the field pilot testing is completed, the results, conclusions, and recommendations will be presented to the **Interdepartmental Rangeland Inventory, Monitoring, and Assessment Steering Group** for approval. The Federal Geographic Data Committee will be used to ensure agency and stakeholder concurrence and to establish Federal standards for the indicators.

Step 4: Develop Technical References, Agency Policy, and Procedures for Implementing the Periodic National Cooperative Rangeland Survey

Successful implementation of the periodic National Cooperative Rangeland Survey will require the development and distribution of interagency technical references that outline such items as standard data collection procedures, data and metadata standards, storage and retrieval protocols, and changes in agency policy.

Step 5: Conduct Interagency Training

Interagency field training of agency personnel in the implementation of standard periodic National Cooperative Rangeland Survey protocol for collecting, analyzing, and interpreting monitoring data is critical for achieving consistency between agencies.

Step 6: Conduct Periodic Interagency Quality Control Evaluations

Achieving and maintaining consistently high quality monitoring information requires periodic evaluation of the procedures for collecting, analyzing, and reporting an interpretation of the information. Evaluations should not only address the implementation of the procedure in the field but also the storage and retrieval of information collected, analyzed, and reported.

What is the Projected Cost of a Periodic National Cooperative Rangeland Survey?

On the basis of the NRI and FIA platforms, it is projected that a national survey of approximately 8,000 sample points, which represents one sample point per 100,000 acres, would be required to compile an inventory and assess the condition of the Nation's rangelands. Experience with NRI and FIA also projects an average cost of $1,000 per sample point, which leads to a total funding need of an estimated $8 million each time a periodic National Cooperative Rangeland Survey is implemented to assess America's rangelands.

Attachment 1

Total Rangeland Acreage by Land Ownership
Total Rangeland Acreage Requiring Soil Survey
Total Rangeland Acreage Requiring Ecological Site Correlation

Land Ownership	Total Rangeland Acres[6] and Percentage of Total		Rangeland Acreage and Percentage of Total Acreage Needing Soil Survey and Collection of New Ecological Information		Rangeland Acreage and Percentage of Total Acreage Needing Ecological Site Correlation	
Lands Administered by Federal Agencies[7]	412,115,000	48.9%	219,598,000	56.2%	345,164,000	51.9%
Non-Federal Lands (private)	430,008,000	51.1%	171,338,000	43.8%	320,405,000	48.1%
TOTAL	842,123,000	100.0%	390,936,000	100.0%	665,569,000	100.0%

[6] Based on acreage figures in the Soil Survey Schedule maintained by the Soil Survey Division of the Natural Resources Conservation Service (NRCS). State NRCS soil scientists used County-based statistics from the NRCS National Resources Inventory, as well as knowledge of the area, to estimate the extent of rangeland on private and Native American lands. This information was also used to extrapolate Federal land rangeland acreage.

[7] Department of the Interior: Bureau of Land Management, U.S. Fish and Wildlife Service, National Park Service, Bureau of Indian Affairs
Department of Agriculture: U.S. Forest Service
Other Federal Agencies: Department of Defense, Bureau of Reclamation, Department of Energy and other Federal agencies.